

Designing with Nature: Green Walls



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Green walls

Definitions, terminology and categorisation

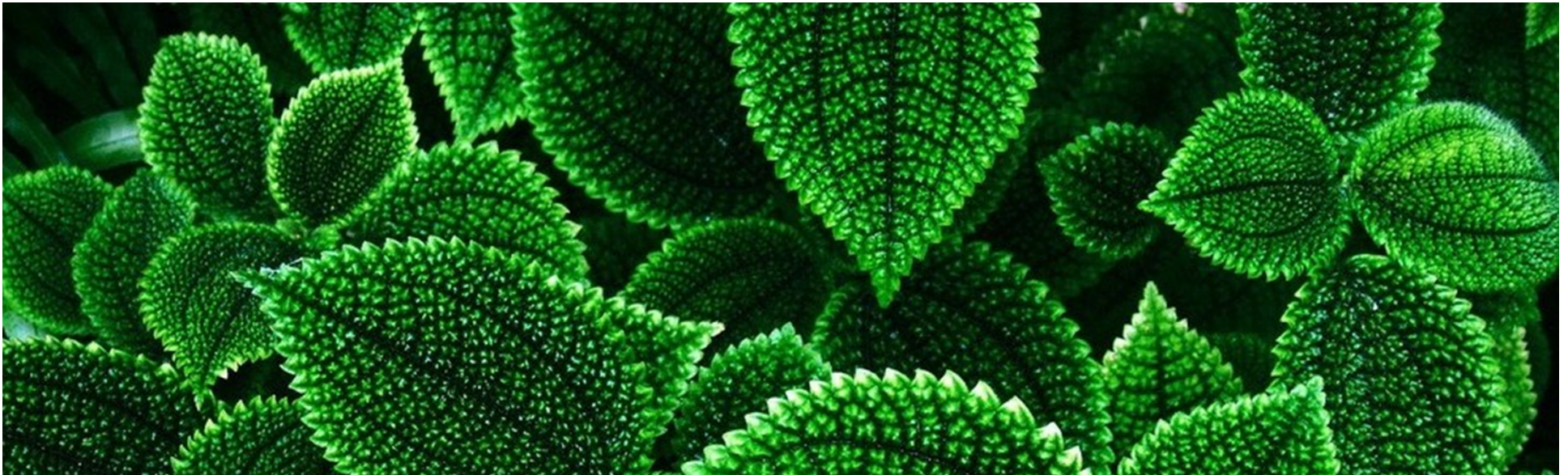
Ecosystem services (Why should we build green walls?)

Workshop:

How can we progress development of green walls in Scotland?

Are schools and workplaces a good place to start?





Definitions, Terminology, Categorisation



What is a green wall?



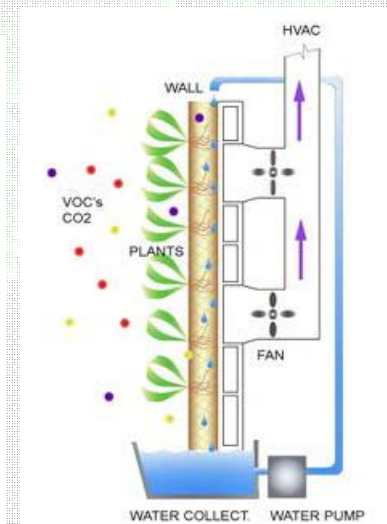
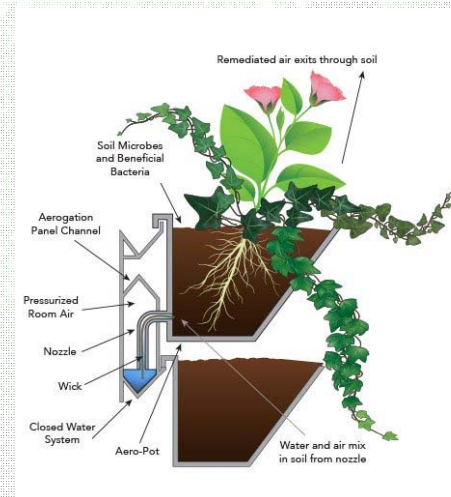
“Vegetation growing
on or against a
vertical surface” –
Staffordshire
University
Green Wall Centre

Types of green wall

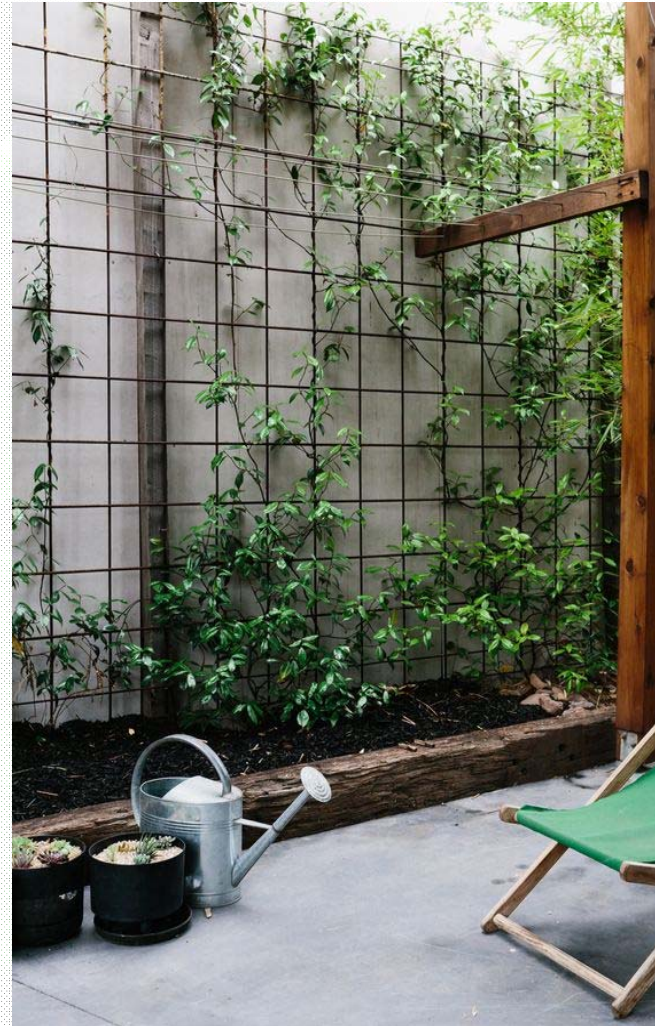
Growing medium:
ground vs wall

Hydroponic vs soil/substrate

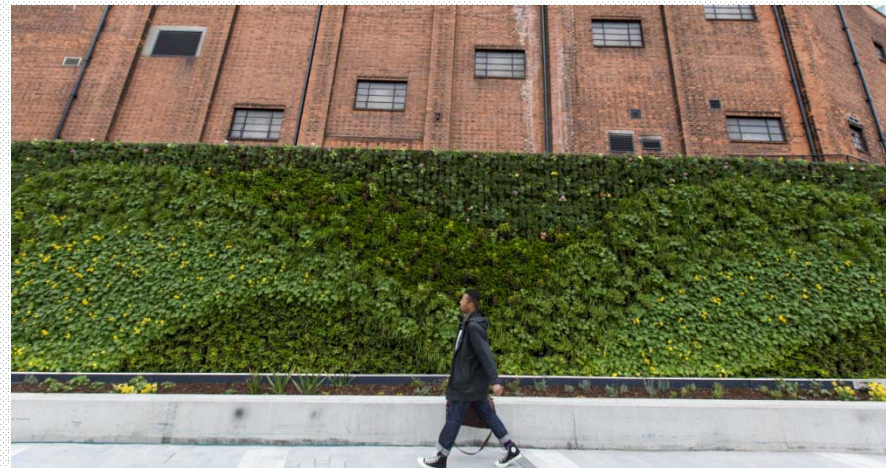
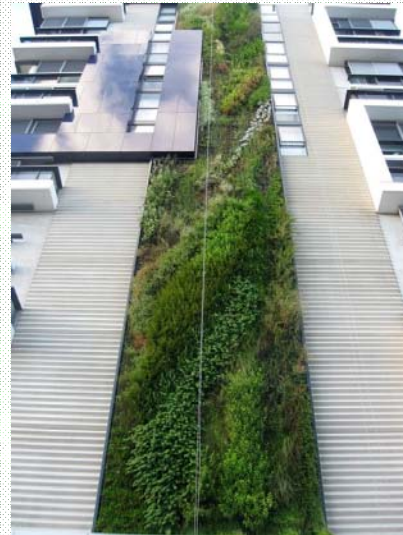
Active ('biofilter') vs passive:
air pumps vs none



Green façades



'Modular' green walls (hydroponic or soil/substrate)

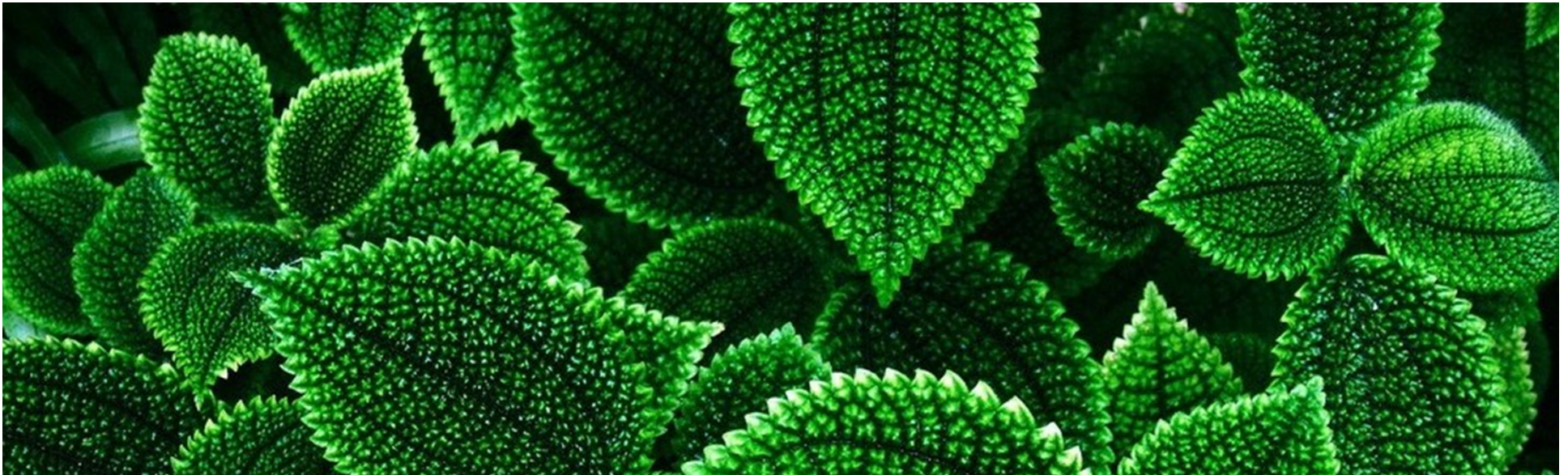


Green screens



Green Wall, Living Wall or Vertical Garden?





Green Wall Ecosystem Services



Green Walls Ecosystem Services

Biodiversity

e.g. Chiquet et al (2014): animal biodiversity and characteristics of green walls (birds, molluscs, spiders, insects)

e.g. Atkins et al (2015): bird use of hedges and design of LW's

Air quality

e.g. Sternberg et al (2010): Ivy walls

e.g. Pugh et al (2012): modelling study

e.g. Dover (2016): Agrosoci Aerogation Active Green Wall – NO₂

e.g. Torpy et al / Sydney Uni. Tech. 'Junglefly Breathing Wall'

e.g. Carslaw et al (2015): *negative* impact of plant VOCs on IAQ



Green Walls Ecosystem Services

Urban cooling/ UHI

e.g. Price et al (2015): Vertical greenery systems as a strategy

Noise abatement

e.g. Veisten et al (2012): green walls as soundscape measures

e.g. Coma et al (2015): acoustic insulation in buildings

Water management

e.g. Köhler (2007): Rain water management with green roofs and living walls

Environmental aesthetics

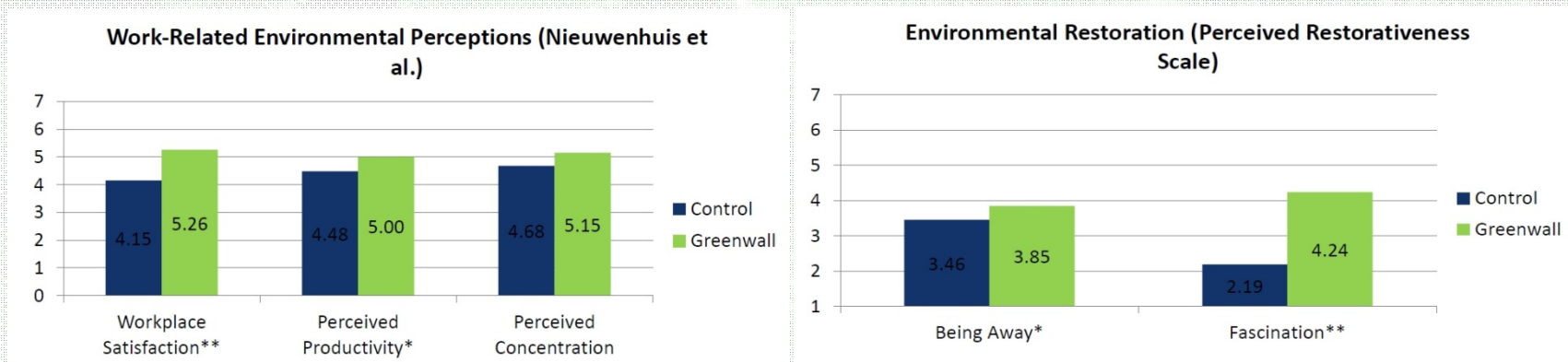
e.g. Sutton (2014): Aesthetics for green roofs and walls

Green Walls Ecosystem Services

Human health and wellbeing

e.g. Rootes et al (2015): green wall in a schools

- Significant increase in *Workplace satisfaction + Perceived productivity*
- Perceived 'restorativeness': *Being away + Fascination*
- Mood: *Valence + Pleasant activation*



e.g. Statistic Ltd: Naava active greenwalls in work environments – reduced health symptoms (tiredness, coughing, dry + stuffy air)

Green Walls Ecosystem Services

Energy conservation & building protection

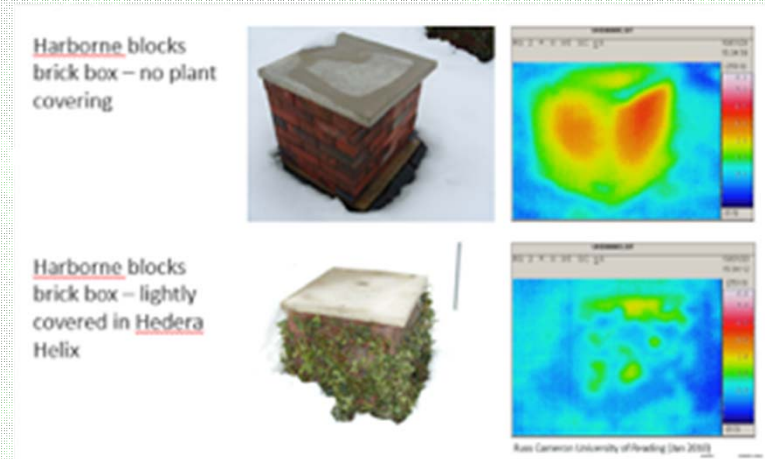
e.g. Cameron et al (2014):

Plant choice and wall cooling

e.g. Perez et al (2014): Vertical greenery systems for energy savings in buildings – a review

Urban Ecotourism

e.g. Kanter Otçu (2015): Role and benefits of vertical gardens in sustainable tourism



Environmental education



Marc Grañén's 'Edible' Vertical Gardens in Schools, Barcelona

Environmental education



Marc Grañén's 'Edible' Vertical Gardens, Barcelona

Bringing Marc Grañén's edible green walls to Scotland



Central Scotland Green Network Ideas Fund Competition Winner 2016

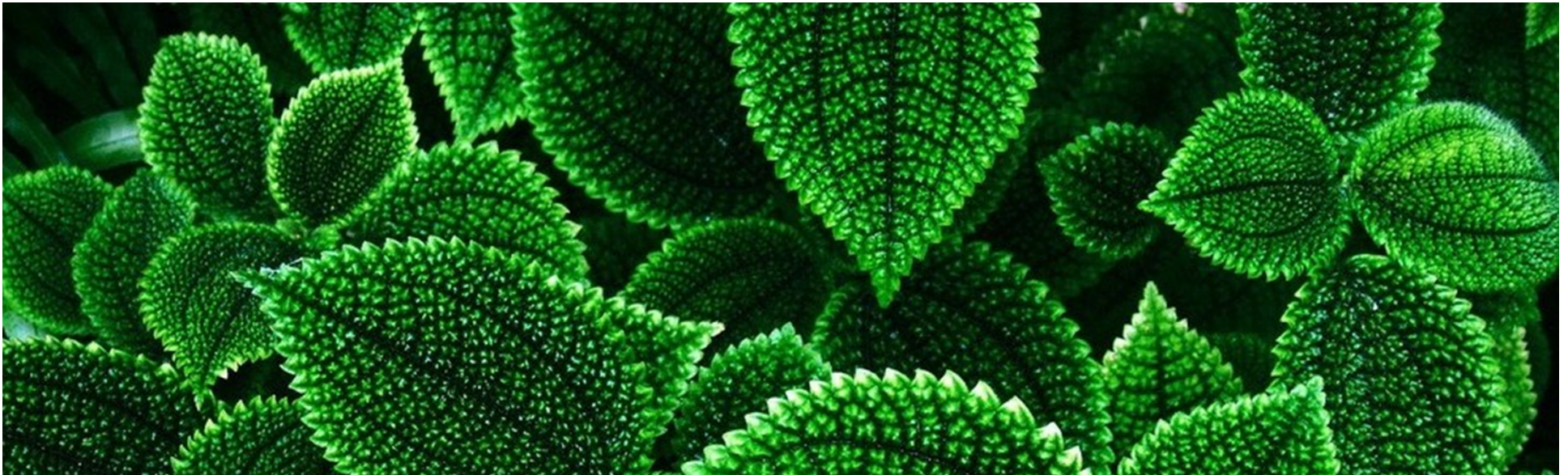


**THE GLASGOW
SCHOOL: ARE**



Helping to deliver the





Workshop





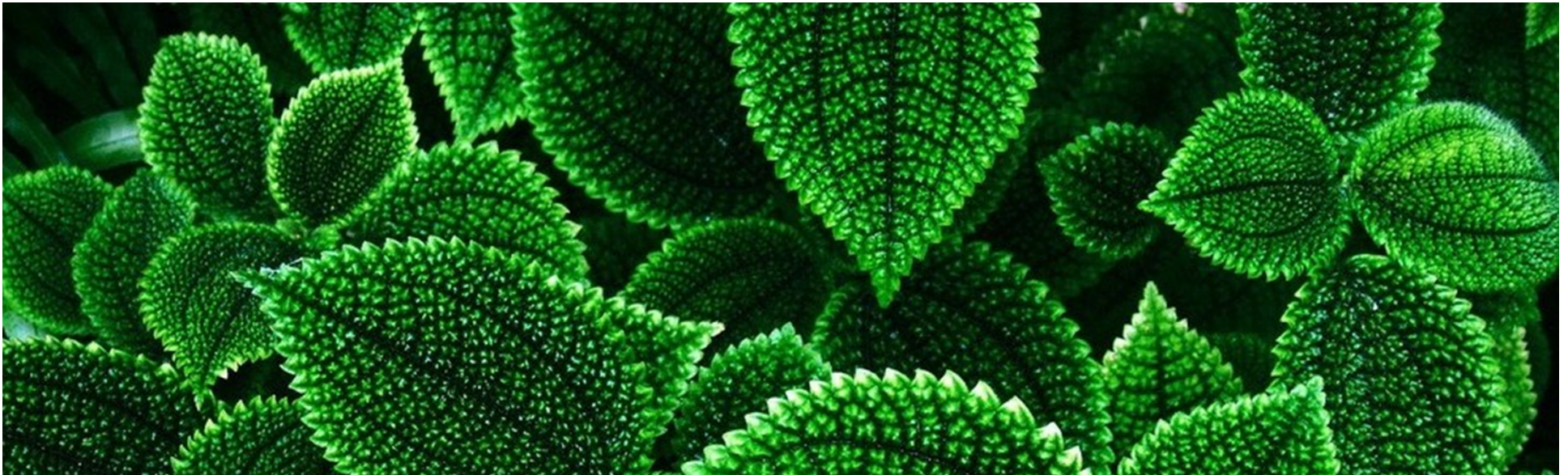
How can we progress development of green walls in Scotland?

What opportunities and barriers are there?

Who are the key organisations that might be involved?

What research needs to be done?

What can we do to ensure sustainability and best practice?



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